

# Freeform Optics: A Non-Contact "Test Plate" for Manufacturing, Phase I

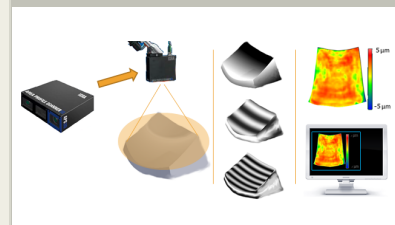
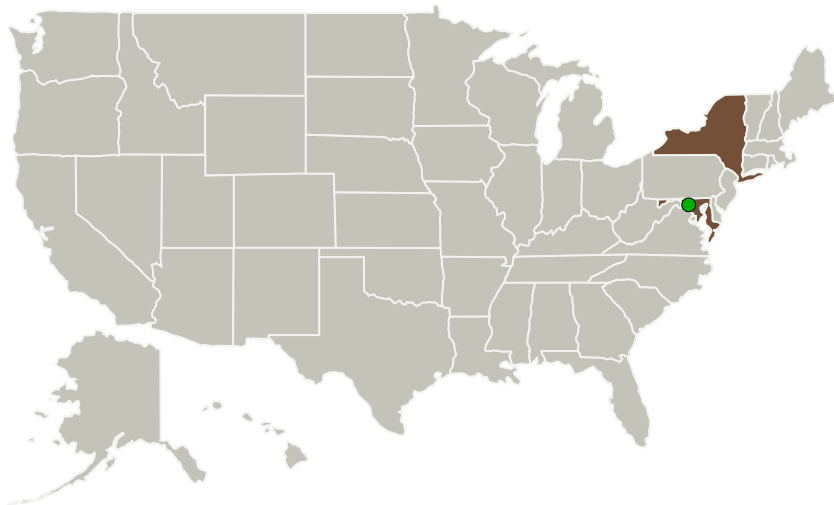
Completed Technology Project (2015 - 2015)



## Project Introduction

The goal of this NASA SBIR Phase I study is to determine the feasibility of measuring precision (fractional wave) freeform optics using non-contact areal (imaging) optical sensors measuring slope data. Fabrication of a physical "test plate" for each freeform design is impractical and cost prohibitive. Nevertheless, surfaces must be inspected while the part is still fixed or blocked (one surface exposed). The proposed innovation is a non-contact metrology method for manufacture of precision freeform optical surfaces; a tool to play the role of the test plate in conventional optical testing. The proposed method is to be implemented as close to the CNC machine as possible to provide rapid and regular feedback to opticians throughout manufacture. Once implemented into the freeform manufacturing process, this procedure has great potential to streamline processing while increasing the manufacturing technician's information about surface condition during production. NASA and many other agencies and companies have a stated critical need for high-quality freeform optical components, and will benefit from improvements to production and testing of freeforms. Metrology is currently one gating item in the manufacturing of precision freeform surfaces.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Optimax Systems, Inc.	Lead Organization	Industry	Ontario, New York
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New York

## Project Transitions

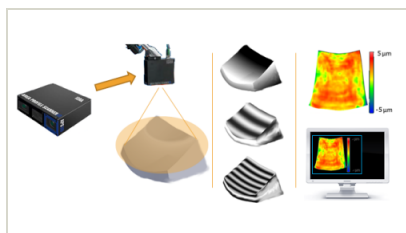
**June 2015:** Project Start**December 2015:** Closed out

**Closeout Summary:** Freeform optics: a non-contact "test plate" for manufacturing, Phase I Project Image

**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/139017>)

## Images

**Briefing Chart Image**

Freeform optics: a non-contact "test plate" for manufacturing, Phase I

(<https://techport.nasa.gov/image/131323>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Optimax Systems, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

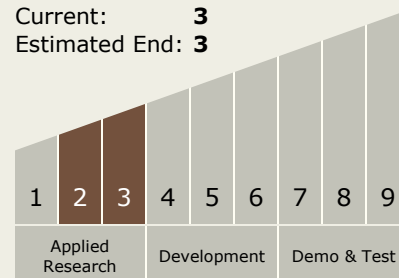
Carlos Torrez

**Principal Investigator:**

Brian W Myer

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



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## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.3 Optical Components

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System